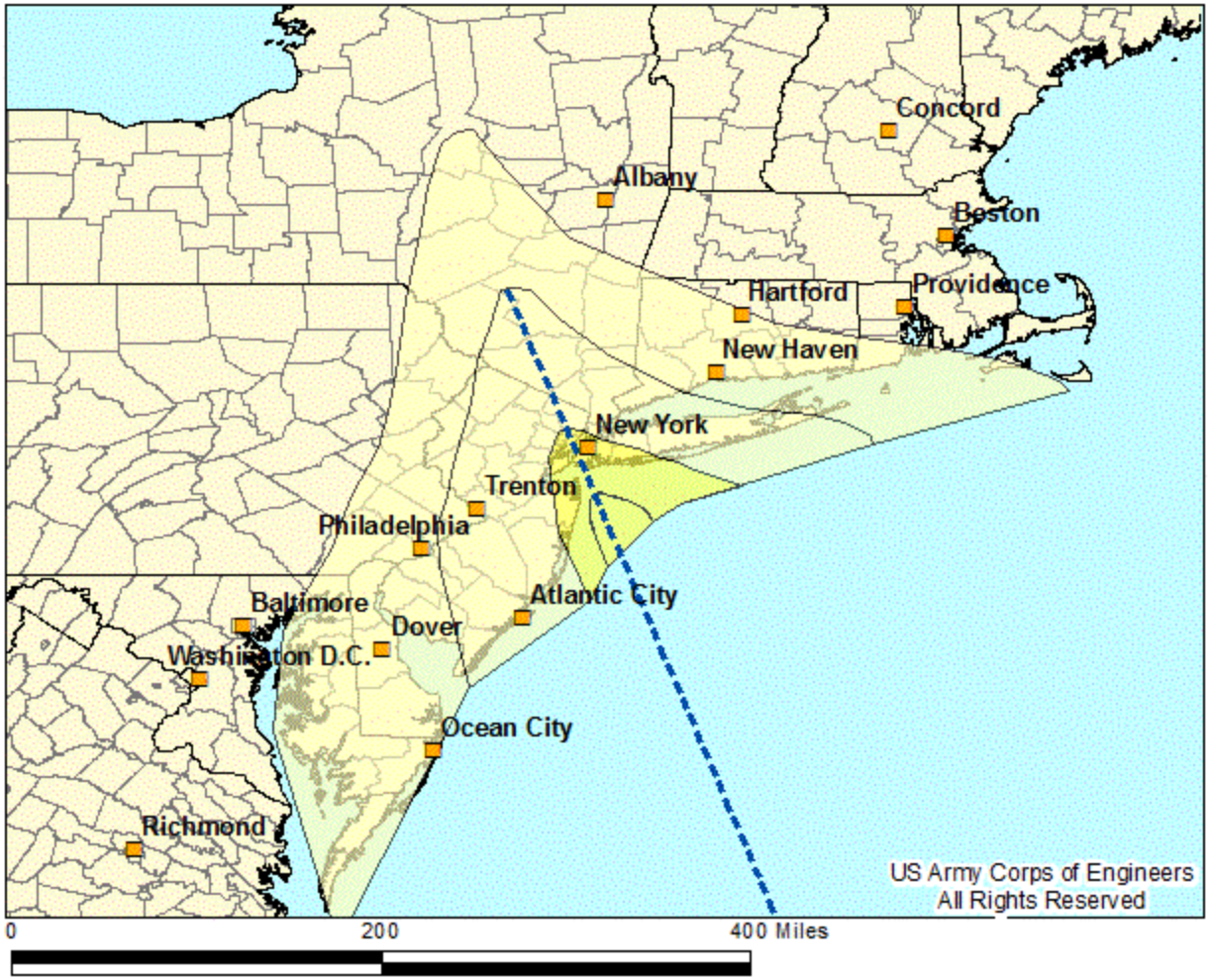
Hurricane Sandy Projected Damage Areas

US Army Corps of Engineers

Landfall Expected In About 96 Hours

For Planning Purposes Only!



Post Landfall Projected Damage Areas

This model is based on a Category 1 storm making landfall on New York, NY.

Forecast Track

Projected Damage Areas

- CAT 0-type damage
- CAT 1-type damage
- CAT 2-type damage
- CAT 3-type damage
- CAT 4-type damage
- CAT 5-type damage

Information provided on this page displays a projected or actual Category 1 storm making landfall on New York, NY. These projections are based on information from the NHC (1430 EDT 10/25/2012) forecast and extrapolated by LRL staff to represent a landfall condition that has either occurred or may occur in the near future.

Details about this model may be obtained at http://www.englink.usace.army.mil or contact Louisville District staff at DLL-CELRL-GIS@usace.army.mil

Hurricane Sandy Projected Damage Areas

Generated By:
P.Keown, LRL 1500 EDT 10/25/2012

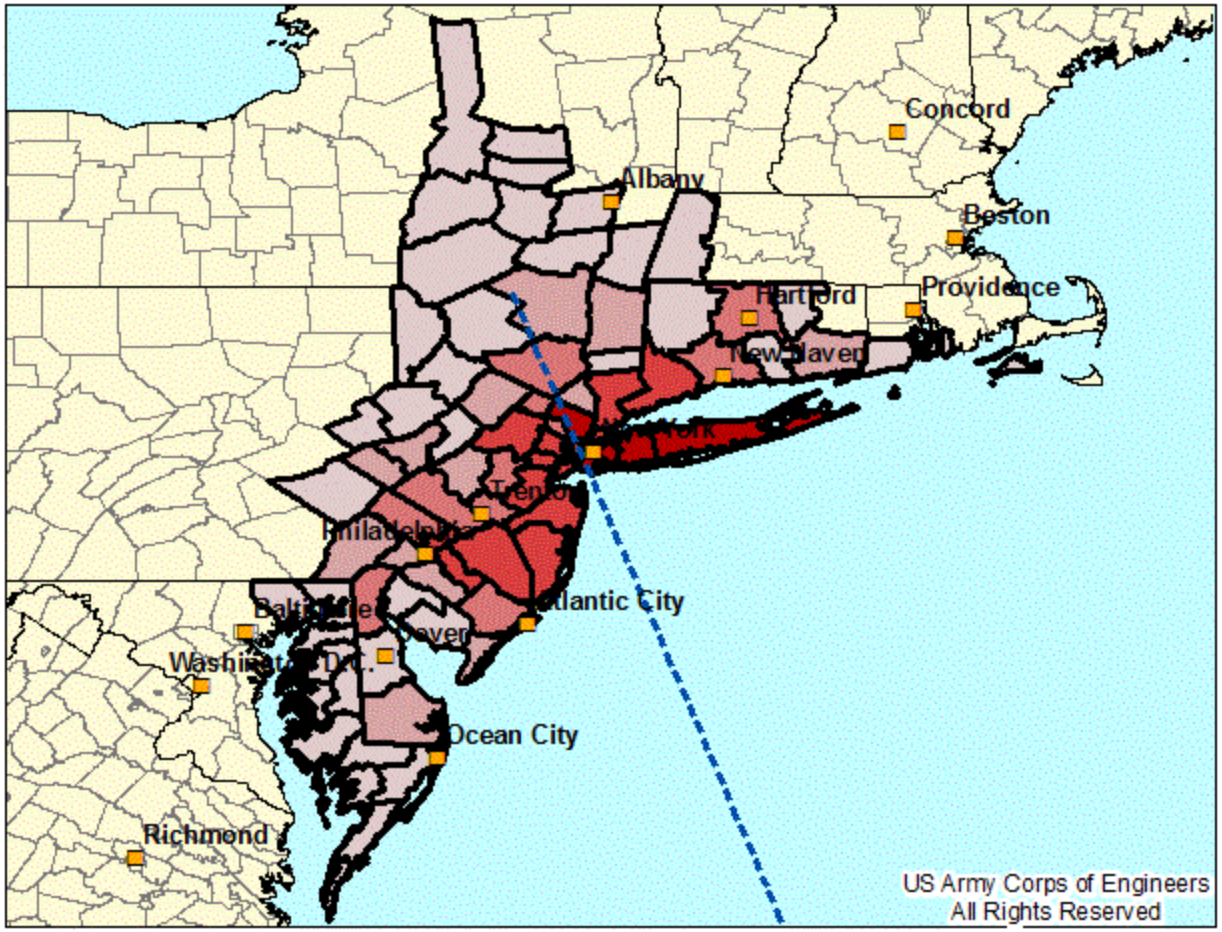
Sources:
HURREVAC
LRL-DEBRIS

US Army Corps of Engineers

Hurricane Sandy Debris Model

Landfall Expected In About **96** Hours

For Planning Purposes Only!



Post Landfall Debris Model Results

New York - 10,031,000 Yards
New Jersey - 9,990,000 Yards
Pennsylvania - 2,469,000 Yards
Connecticut - 1,467,000 Yards
Delaware - 507,000 Yards
Maryland - 275,000 Yards
Rhode Island - 67,000 Yards
Virginia - 29,000 Yards
Massachusetts - 3,000 Yards

Model results per County on following page

This model is based on a Category 1 storm making landfall on New York, NY.

Forecast Track

Debris

- < 100,000 cubic yards
- 100,000 - 249,999 cubic yards
- 250,000 - 499,999 cubic yards
- 500,000 - 999,999 cubic yards
- >1,000,000 cubic yards

Information provided on this page displays a Category 1 storm making landfall on New York, NY. These projections are based on information from the NHC (1430 EDT 10/25/2012) forecast. The amount of debris forecasted is possible total volume, not necessarily the volume that may need to be removed with Federal funds, but does not include volume that may be covered by private insurance. Debris volume may include storm surge generated debris.

Details about this model may be obtained at http://www.englink.usace.army.mil
or contact Louisville District staff at DLL-CELRL-GIS@usace.army.mil

Hurricane Sandy Debris Model

Generated By:
P.Keown, LRL 1500 EDT 10/25/2012

Sources:
HURREVAC
LRL-DEBRIS

US Army Corps of Engineers

Hurricane Sandy Debris Model

Landfall Expected In About 96 Hours

For Planning Purposes Only!

State	Yards per State	County	Yards per County
Connecticut		Fairfield County	552,000
		Hartford County	256,000
		Litchfield County	96,000
		Middlesex County	93,000
		New Haven County	350,000
		New London County	116,000
		Tolland County	4,000
Connecticut	1,467,000		
Delaware		Kent County	84,000
		New Castle County	293,000
		Sussex County	130,000
Delaware	507,000		
Maryland		Caroline County	18,000
		Cecil County	49,000
		Dorchester County	25,000
		Harford County	15,000
		Kent County	12,000
		Queen Anne's County	24,000
		Somerset County	15,000
		Talbot County	27,000
		Wicomico County	56,000
		Worcester County	34,000
Maryland	275,000		
Massachusetts		Berkshire County	< 1,000
		Dukes County	3,000
Massachusetts	3,000		
New Jersey		Atlantic County	310,000
New Jersey (continued)		Bergen County	1,143,000
		Burlington County	529,000
		Camden County	535,000
		Cape May County	104,000
		Cumberland County	100,000
		Essex County	814,000
		Gloucester County	197,000
		Hudson County	783,000
		Hunterdon County	124,000
		Mercer County	388,000
		Middlesex County	868,000
		Monmouth County	967,000
		Morris County	548,000
		Ocean County	864,000
		Passaic County	489,000
		Salem County	38,000
		Somerset County	357,000
		Sussex County	155,000
		Union County	602,000
		Warren County	75,000
New Jersey	9,990,000		
New York		Albany County	< 1,000
		Bronx County	566,000
		Columbia County	14,000
		Delaware County	39,000
		Dutchess County	139,000
		Fulton County	< 1,000
		Greene County	21,000

The amount of debris forecasted is possible total volume, not necessarily the volume that may need to be removed with Federal funds, but does not include volume that may be covered by private insurance. Debris volume may include storm surge generated debris.

Details about this model may be obtained at http://www.englink.usace.army.mil or contact Louisville District staff at DLL-CELRL-GIS@usace.army.mil

Source: US Army Corps of Engineers, All Rights Reserved

Hurricane Sandy Debris Model

Generated By:
P.Keown, LRL 1500 EDT 10/25/2012

Sources:
HURREVAC
LRL-DEBRIS

US Army Corps of Engineers

Hurricane Sandy Debris Model

Landfall Expected In About 96 Hours

For Planning Purposes Only!

State	Yards per State	County	Yards per County
New York		Herkimer County	34,000
(continued)		Kings County	1,875,000
		Montgomery County	7,000
		Nassau County	1,353,000
		New York County	859,000
		Orange County	289,000
		Otsego County	34,000
		Putnam County	64,000
		Queens County	1,941,000
		Richmond County	523,000
		Rockland County	227,000
		Schoharie County	16,000
		Suffolk County	1,186,000
		Sullivan County	67,000
		Ulster County	125,000
		Westchester County	652,000
New York	10,031,000		
Pennsylvania		Berks County	26,000
		Bucks County	444,000
		Carbon County	< 1,000
		Chester County	202,000
		Delaware County	235,000
		Lehigh County	141,000
		Monroe County	75,000
		Montgomery County	357,000
		Northampton County	133,000
		Philadelphia County	794,000
		Pike County	35,000
		Wayne County	27,000
Pennsylvania	2,469,000		

State	Yards per State	County	Yards per County
Rhode Island		Newport County	20,000
		Washington County	47,000
Rhode Island	67,000		
Virginia		Accomack County	22,000
		Northampton County	7,000
Virginia	29,000		

The amount of debris forecasted is possible total volume, not necessarily the volume that may need to be removed with Federal funds, but does not include volume that may be covered by private insurance. Debris volume may include storm surge generated debris.

Details about this model may be obtained at http://www.englink.usace.army.mil or contact Louisville District staff at DLL-CELRL-GIS@usace.army.mil

Source: US Army Corps of Engineers, All Rights Reserved

Hurricane Sandy Debris Model

Generated By:
P.Keown, LRL 1500 EDT 10/25/2012

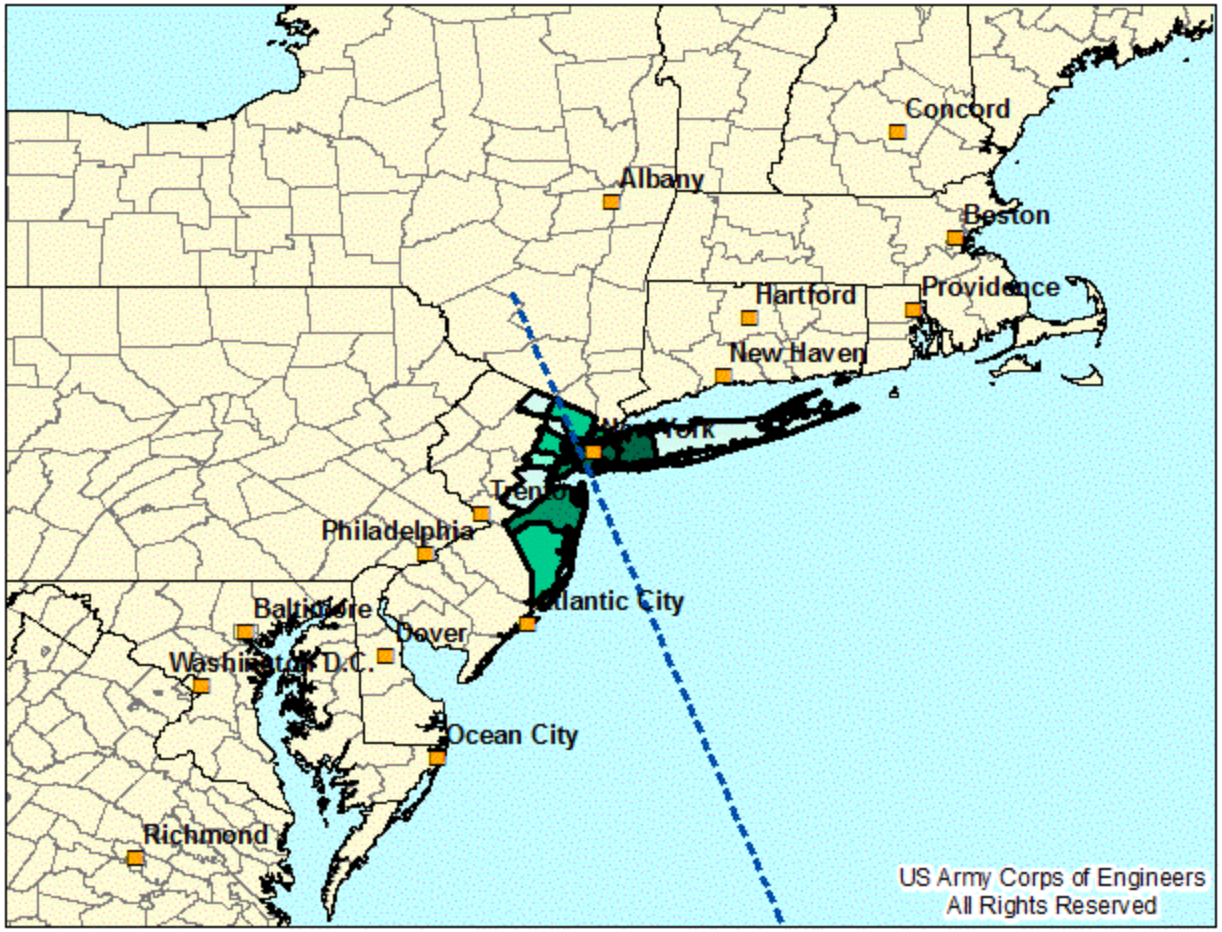
Sources:
HURREVAC
LRL-DEBRIS

US Army Corps of Engineers

Hurricane Sandy Commodities Model

Landfall Expected In About **96** Hours

For Planning Purposes Only!



Post Landfall Water Model Results

Day One / Day Two / Day Three
NY – 617/308/154 Truckloads
NJ – 141/70/35 Truckloads

Model results per County on following page

This model is based on a Category 1 storm making landfall on New York, NY.

Forecast Track

Commodities

- < 5 Trucks Each
- 5 - 10 Trucks Each
- 11 - 20 Trucks Each
- 21 - 40 Trucks Each
- > 40 Trucks Each

Information provided on this page displays a Category 1 storm making landfall on New York, NY. These projections are based on information from the NHC ***(1430 EDT 10/25/2012)*** forecast. The amount of commodities forecasted is based on Mission Guide Book requirements and SME input. The graphic represents daily needs with a ramp-up in the distribution system – three days for Points of Distribution (PODs) to be fully in place and operational. Volume shown is for each commodity – water and ice. Commodity need may be supplied by multiple agencies and/or sources.

Details about this model may be obtained at http://www.englink.usace.army.mil
or contact Louisville District staff at DLL-CELRL-GIS@usace.army.mil

Hurricane Sandy Commodities Model

Generated By:
P.Keown, LRL 1500 EDT 10/25/2012

Sources:
HURREVAC
LRL-DEBRIS

US Army Corps of Engineers

Hurricane Sandy Commodities Model

Landfall Expected In About **96** Hours

For Planning Purposes Only!

State	Truckloads per State	County	Truckloads per County
New Jersey		Bergen County	18
		Essex County	15
		Hudson County	53
		Middlesex County	1
		Monmouth County	34
		Ocean County	11
		Passaic County	2
		Union County	7
New Jersey	141		
New York		Bronx County	21
		Kings County	200
		Nassau County	63
		New York County	115
		Queens County	180
		Richmond County	37
		Suffolk County	1
New York	617		

Source: US Army Corps of Engineers, All Rights Reserved

The amount of commodities forecasted is based on Mission Guide Book requirements and SME input and the above table indicates suggested daily needs based on full deployment of a commodities distribution system. Volume shown is for each commodity – water and ice. Commodity need may be supplied by multiple agencies and/or sources.

Details about this model may be obtained at http://www.englink.usace.army.mil or contact Louisville District staff at DLL-CELRL-GIS@usace.army.mil

Hurricane Sandy Commodities Model

Generated By:
P.Keown, LRL 1500 EDT 10/25/2012

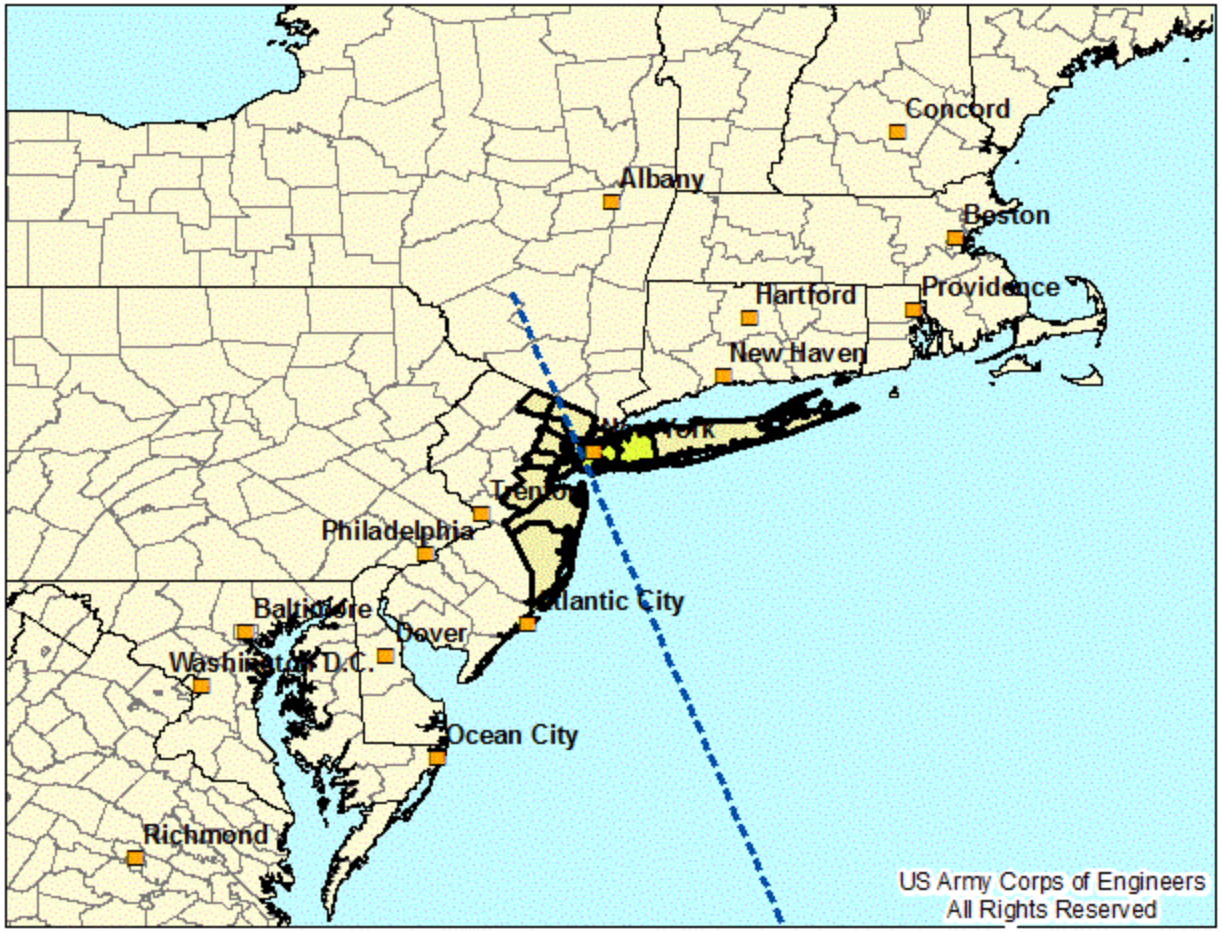
Sources:
HURREVAC
LRL-DEBRIS

US Army Corps of Engineers

Hurricane Sandy Temporary Roofing Model

Landfall Expected In About 96 Hours

For Planning Purposes Only!



Post Landfall Temporary Roofing Model Results

New York - 11,100
New Jersey - 4,100

Model results per County on following page

This model is based on a Category 1 storm making landfall on New York, NY.

Forecast Track

Temporary Roofing

- < 2,000 units
- 2,000 - 3,999 units
- 4,000 - 5,999 units
- 6,000 - 9,999 units
- > 10,000 units

Information provided on this page displays a Category 1 storm making landfall on New York, NY. These projections are based on information from the NHC (1430 EDT 10/25/2012) forecast. Temporary roofing is based on 1% in CAT 1.

Details about this model may be obtained at http://www.englink.usace.army.mil or contact Louisville District staff at DLL-CELRL-GIS@usace.army.mil

Hurricane Sandy Roofing Model	
Generated By: P.Keown, LRL 1500 EDT 10/25/2012	
Sources: HURREVAC LRL-DEBRIS	Page 7 of 19

US Army Corps of Engineers

Hurricane Sandy Temporary Roofing Model

Landfall Expected In About 96 Hours

For Planning Purposes Only!

State	House Units per State	County	House Units per County
New Jersey		Bergen County	700
		Essex County	400
		Hudson County	1,000
		Middlesex County	< 100
		Monmouth County	1,300
		Ocean County	500
		Passaic County	< 100
		Union County	200
New Jersey	4,100		
New York		Bronx County	200
		Kings County	3,000
		Nassau County	2,300
		New York County	200
		Queens County	4,000
		Richmond County	1,400
		Suffolk County	< 100
New York	11,100		

Temporary roofing is based on 1% in CAT 1.

Details about this model may be obtained at http://www.englink.usace.army.mil
or contact Louisville District staff at DLL-CELRL-GIS@usace.army.mil

Source: US Army Corps of Engineers, All Rights Reserved

Hurricane Sandy Roofing Model

Generated By:
P.Keown, LRL 1500 EDT 10/25/2012

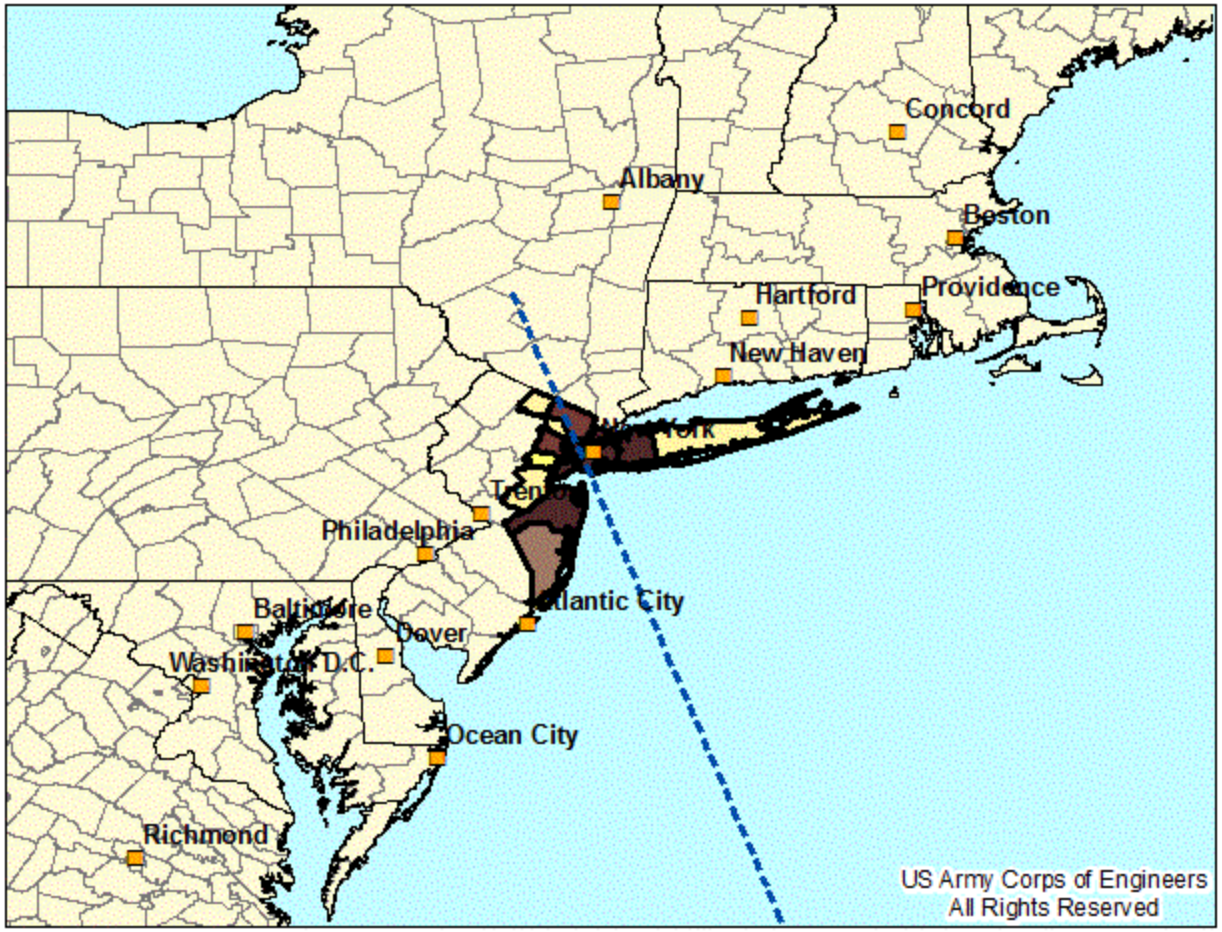
Sources:
HURREVAC
LRL-DEBRIS

US Army Corps of Engineers

Hurricane Sandy Population Model

Landfall Expected In About **96** Hours

For Planning Purposes Only!



Post Landfall Population Model Results

New York - 7,676,000
New Jersey - 1,696,000

Model results per County on following page

This model is based on a Category 1 storm making landfall on New York, NY.

Forecast Track

Population

- < 25,000 persons
- 25,000 - 99,999 persons
- 100,000 - 174,999 persons
- 175,000 - 249,999 persons
- > 250,000 persons

Information provided on this page displays a Category 1 storm making landfall on New York, NY. These projections are based on information from the NHC (1430 EDT 10/25/2012) forecast. The numbers of persons included in this model output are those that would be included within estimated hurricane force winds (Census 2000 values adjusted to July 2010 values).

Details about this model may be obtained at http://www.englink.usace.army.mil or contact Louisville District staff at DLL-CELRL-GIS@usace.army.mil

Hurricane Sandy Population Model	
Generated By: P.Keown, LRL 1500 EDT 10/25/2012	
Sources: HURREVAC LRL-DEBRIS	

US Army Corps of Engineers

Hurricane Sandy Population Model

Landfall Expected In About **96** Hours

For Planning Purposes Only!

State	Population per State	County	Population per County
New Jersey		Bergen County	220,000
		Essex County	176,000
		Hudson County	657,000
		Middlesex County	6,000
		Monmouth County	417,000
		Ocean County	127,000
		Passaic County	14,000
		Union County	79,000
New Jersey	1,696,000		
New York		Bronx County	258,000
		Kings County	2,495,000
		Nassau County	782,000
		New York County	1,433,000
		Queens County	2,249,000
		Richmond County	453,000
		Suffolk County	6,000
New York	7,676,000		

The number of persons estimated to be within the hurricane force winds comes from Census 2000 values adjusted to July 2010 values.

Details about this model may be obtained at http://www.englink.usace.army.mil
or contact Louisville District staff at DLL-CELRL-GIS@usace.army.mil

Source: US Army Corps of Engineers, All Rights Reserved

Hurricane Sandy Population Model

Generated By:
P.Keown, LRL 1500 EDT 10/25/2012

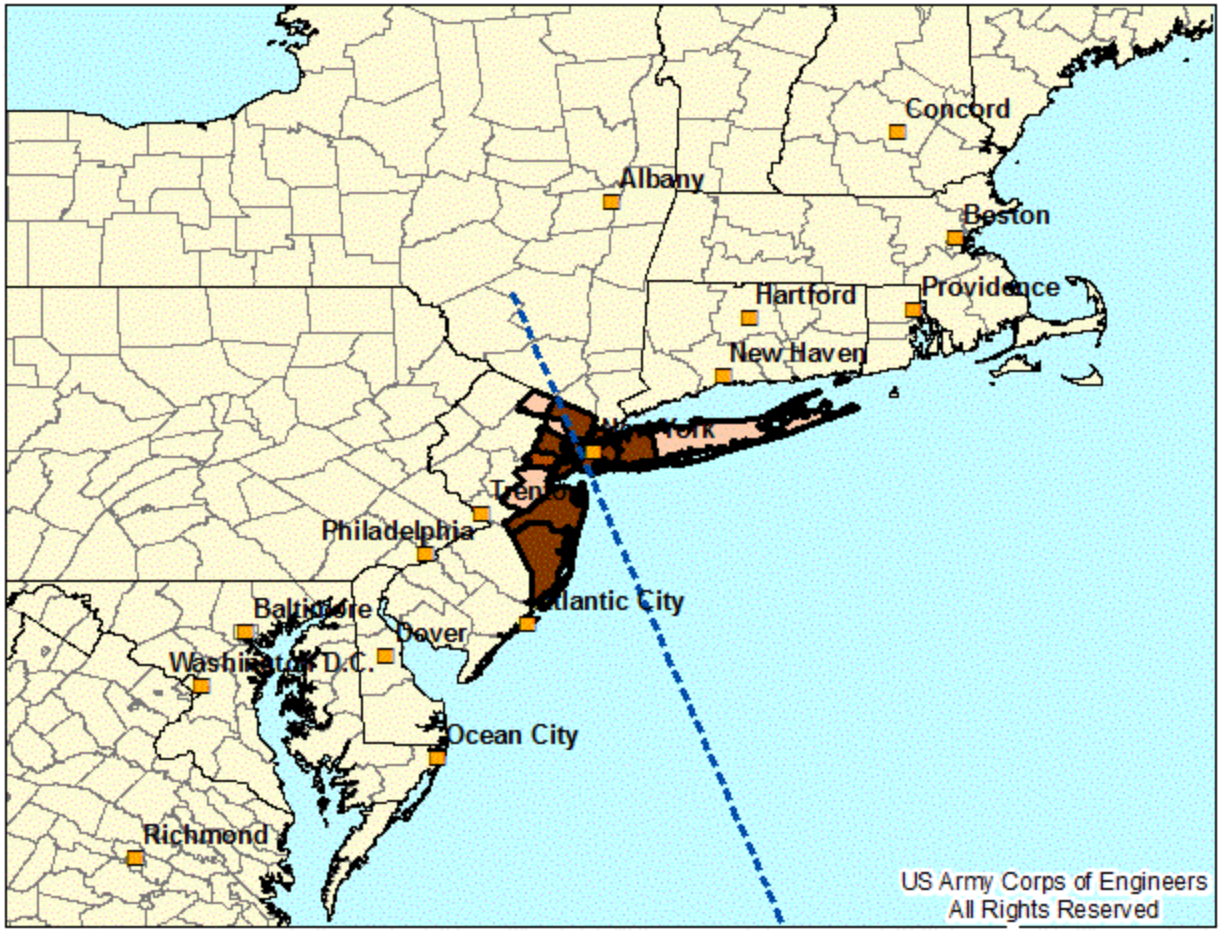
Sources:
HURREVAC
LRL-DEBRIS

US Army Corps of Engineers

Hurricane Sandy Households Model

Landfall Expected In About **96** Hours

For Planning Purposes Only!



0 200 400 Miles

Post Landfall Households Model Results

New York - 2,892,000
New Jersey - 642,000

Model results per County on following page

This model is based on a Category 1 storm making landfall on New York, NY.

Forecast Track

Households

- < 7,500 households
- 7,500 - 14,999 households
- 15,000 - 24,999 households
- 25,000 - 49,999 households
- > 50000 households

Information provided on this page displays a Category 1 storm making landfall on New York, NY. These projections are based on information from the NHC (1430 EDT 10/25/2012) forecast. The numbers of households included in this model output are those that would be included within estimated hurricane force winds (Census 2000 values adjusted to July 2010 values).

Details about this model may be obtained at http://www.englink.usace.army.mil or contact Louisville District staff at DLL-CELRL-GIS@usace.army.mil

Hurricane Sandy Households Model	
Generated By: P.Keown, LRL 1500 EDT 10/25/2012	
Sources: HURREVAC LRL-DEBRIS	Page 11 of 19

US Army Corps of Engineers

Hurricane Sandy Households Model

Landfall Expected In About 96 Hours

For Planning Purposes Only!

State	Households per State	County	Households per County
New Jersey		Bergen County	90,000
		Essex County	61,000
		Hudson County	248,000
		Middlesex County	2,000
		Monmouth County	159,000
		Ocean County	51,000
		Passaic County	5,000
		Union County	26,000
New Jersey	642,000		
New York		Bronx County	81,000
		Kings County	894,000
		Nassau County	260,000
		New York County	708,000
		Queens County	787,000
		Richmond County	160,000
		Suffolk County	2,000
New York	2,892,000		

The number of households estimated to be within the hurricane force winds comes from Census 2000 values adjusted to July 2010 values.

Details about this model may be obtained at http://www.englink.usace.army.mil or contact Louisville District staff at DLL-CELRL-GIS@usace.army.mil

Source: US Army Corps of Engineers, All Rights Reserved

Hurricane Sandy Households Model

Generated By:
P.Keown, LRL 1500 EDT 10/25/2012

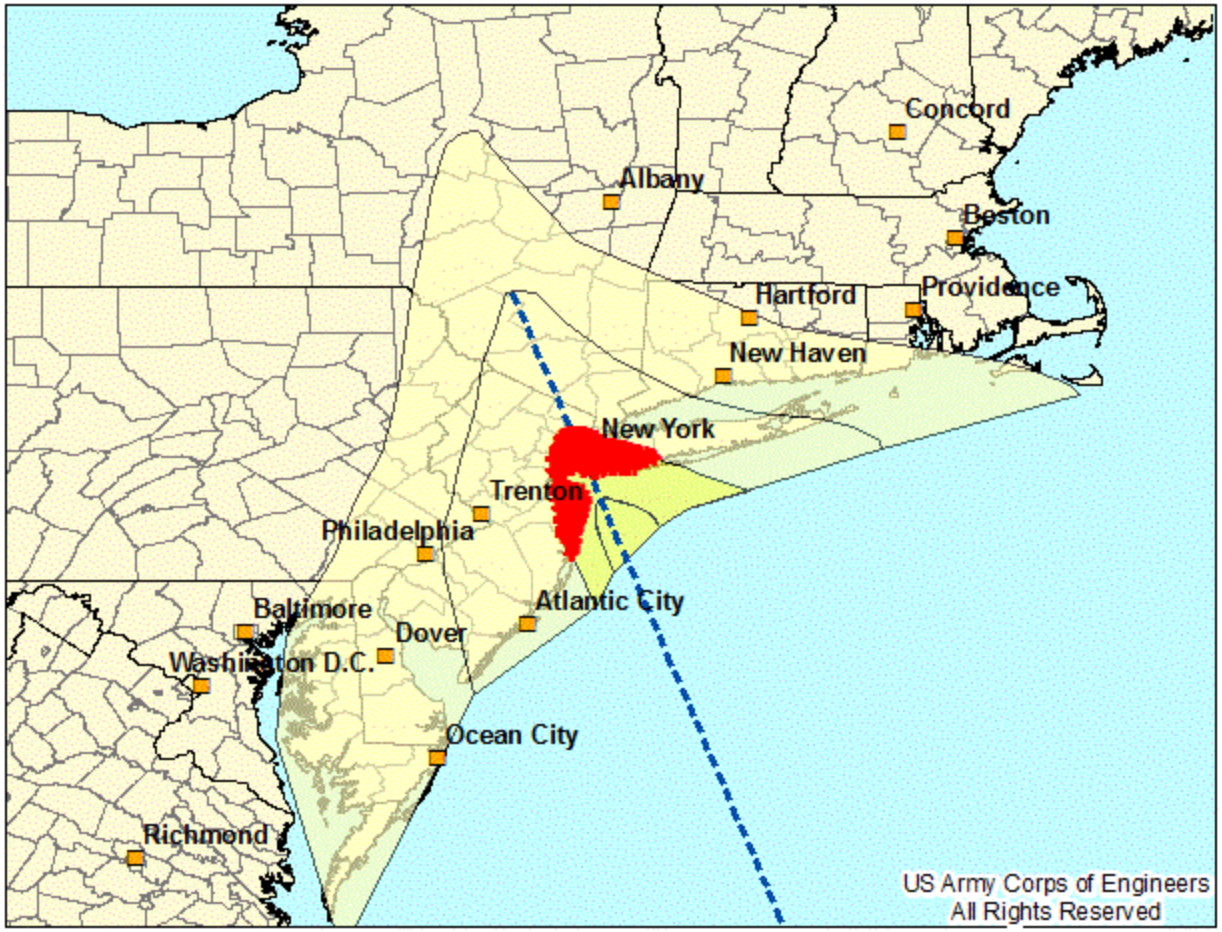
Sources:
HURREVAC
LRL-DEBRIS

US Army Corps of Engineers

Hurricane Sandy Fire Stations

Landfall Expected In About **96** Hours

For Planning Purposes Only!



Most Probable Landfall Fire Stations Inside Hurricane Force Winds

New York - 311
New Jersey - 232

Model results per County on following page

This model is based on a Category 1 storm making landfall on New York, NY.

\+ Fire Stations

Forecast Track

Information provided on this page displays a Category 1 storm making landfall on New York, NY. These projections are based on information from the NHC (1430 EDT 10/25/2012) forecast.

The number of fire stations included in this output are those that would be included within estimated hurricane force winds (data source: HSIP Gold 2011).

Details about this model may be obtained at http://www.englink.usace.army.mil or contact Louisville District staff at DLL-CELRL-GIS@usace.army.mil

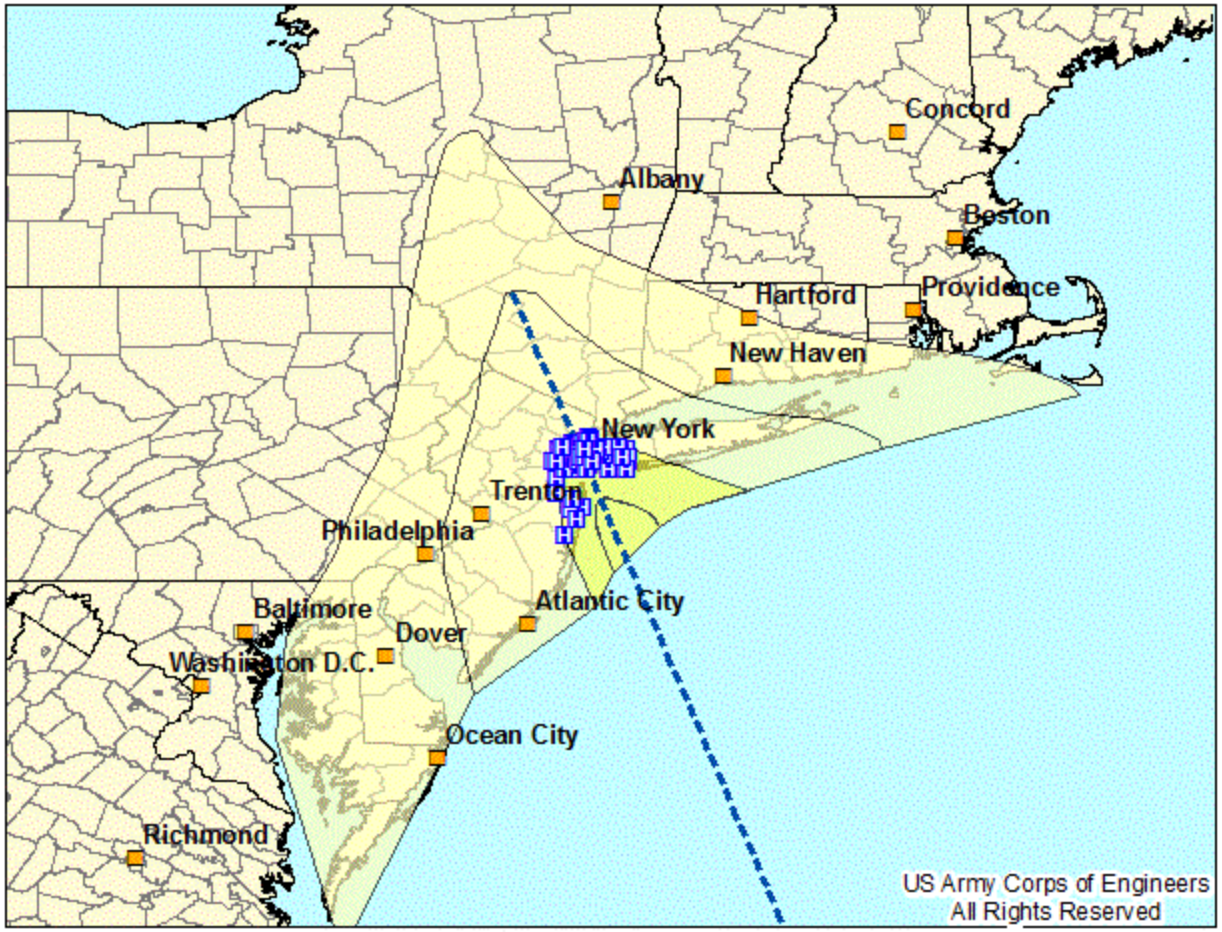
Hurricane Sandy Fire Stations	
Generated By: P.Keown, LRL 1500 EDT 10/25/2012	
Sources: HURREVAC LRL-DEBRIS	Page 13 of 19

US Army Corps of Engineers

Hurricane Sandy Hospitals

Landfall Expected In About **96** Hours

For Planning Purposes Only!



Most Probable Landfall Hospitals Inside Hurricane Force Winds

New York - 59
New Jersey - 22

Model results per County on following page

This model is based on a Category 1 storm making landfall on New York, NY.

H Hospitals

Forecast Track

Information provided on this page displays a Category 1 storm making landfall on New York, NY. These projections are based on information from the NHC (1430 EDT 10/25/2012) forecast.

The number of hospitals included in this output are those that would be included within estimated hurricane force winds (data source: HSIP Gold 2011).

Details about this model may be obtained at http://www.englink.usace.army.mil or contact Louisville District staff at DLL-CELRL-GIS@usace.army.mil

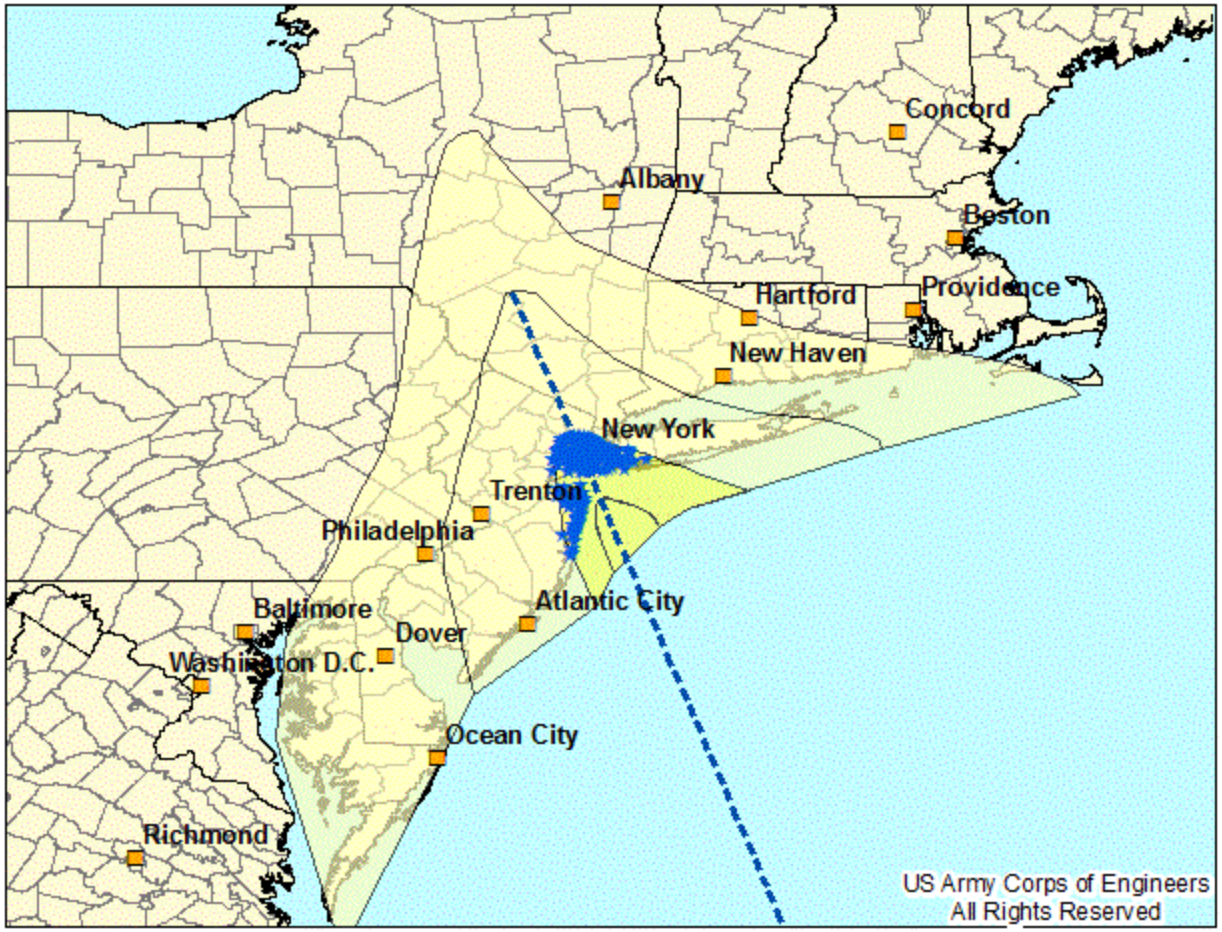
Hurricane Sandy Hospitals	
Generated By: P.Keown, LRL 1500 EDT 10/25/2012	
Sources: HURREVAC LRL-DEBRIS	

US Army Corps of Engineers

Hurricane Sandy Law Enforcement

Landfall Expected In About **96** Hours

For Planning Purposes Only!



Most Probable Landfall Law Enforcement Inside Hurricane Force Winds

New York - 236
New Jersey - 117

Model results per County on following page

This model is based on a Category 1 storm making landfall on New York, NY.

★ Law Enforcement
Forecast Track

Information provided on this page displays a Category 1 storm making landfall on New York, NY. These projections are based on information from the NHC (1430 EDT 10/25/2012) forecast.
The number of law enforcement included in this output are those that would be included within estimated hurricane force winds (data source: HSIP Gold 2011).

Details about this model may be obtained at http://www.englink.usace.army.mil
or contact Louisville District staff at DLL-CELRL-GIS@usace.army.mil

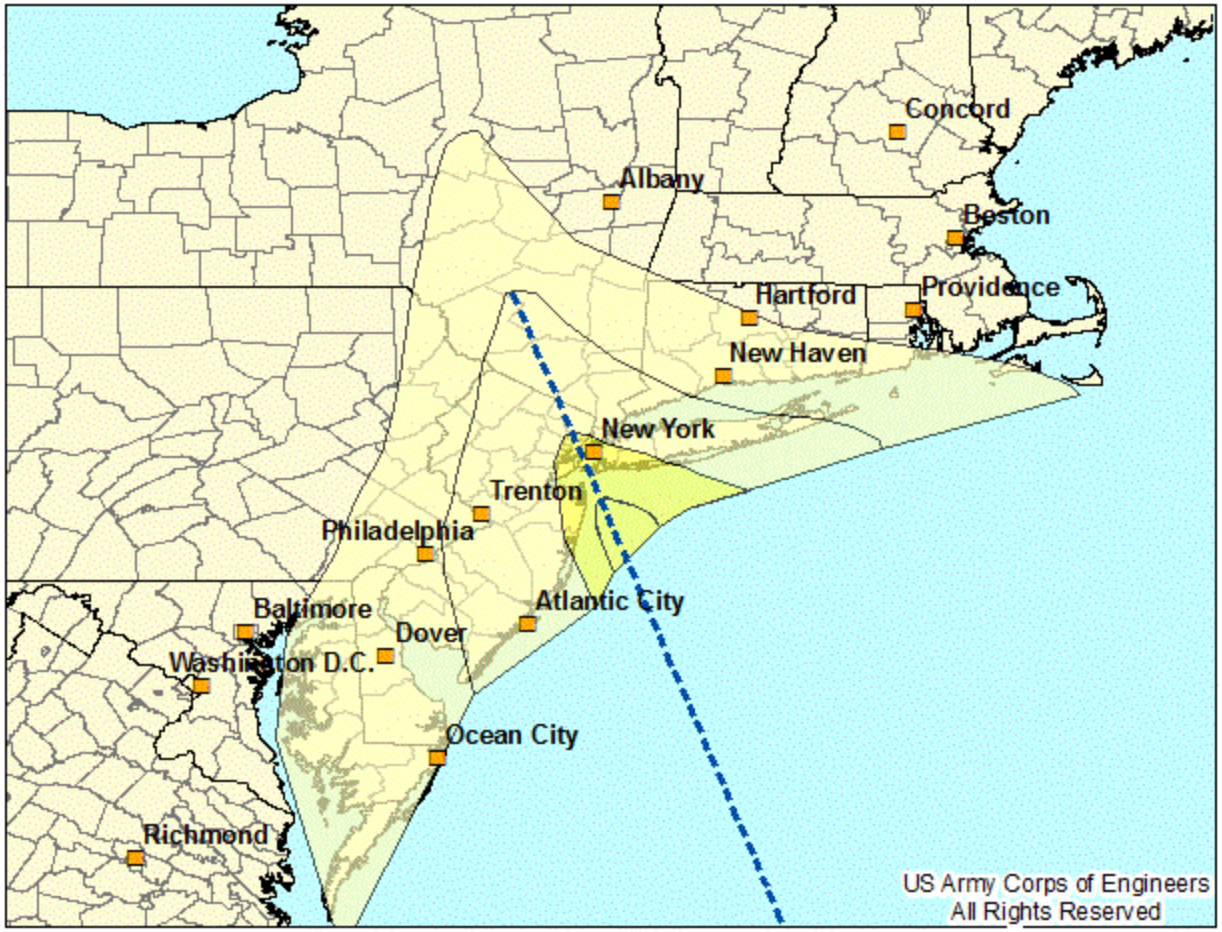
Hurricane Sandy Law Enforcement	
Generated By: P.Keown, LRL 1500 EDT 10/25/2012	
Sources: HURREVAC LRL-DEBRIS	Page 15 of 19

US Army Corps of Engineers

Hurricane Sandy Nuclear Plants

Landfall Expected In About 96 Hours

For Planning Purposes Only!



Most Probable Landfall Nuclear Plants Inside Hurricane Force Winds

Model results per County on following page

This model is based on a Category 1 storm making landfall on New York, NY.

Nuclear Plants

Forecast Track

Information provided on this page displays a Category 1 storm making landfall on New York, NY. These projections are based on information from the NHC (1430 EDT 10/25/2012) forecast.

The number of nuclear plants included in this output are those that would be included within estimated hurricane force winds (data source: HSIP Gold 2011).

Details about this model may be obtained at http://www.englink.usace.army.mil or contact Louisville District staff at DLL-CELRL-GIS@usace.army.mil

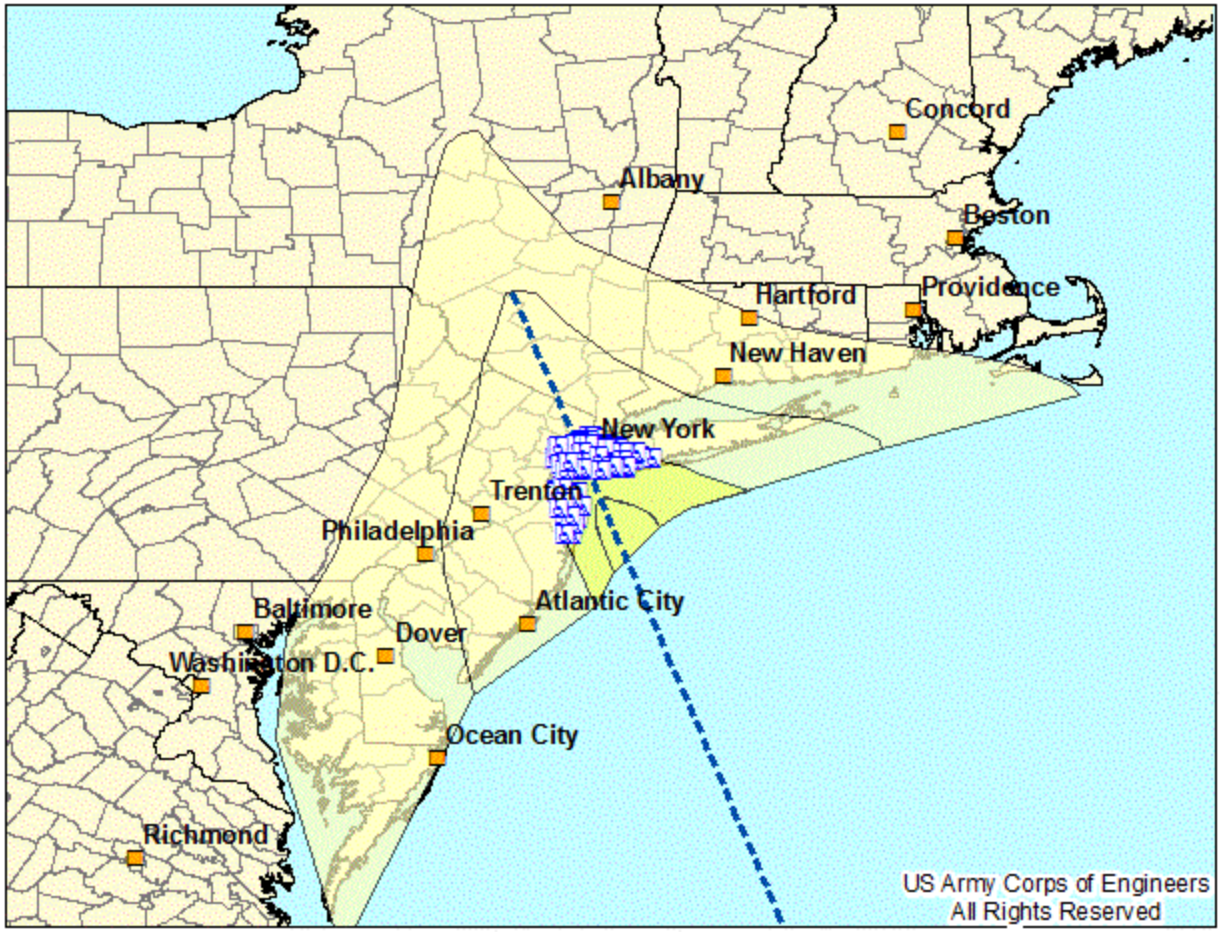
Hurricane Sandy Nuclear Plants	
Generated By: P.Keown, LRL 1500 EDT 10/25/2012	
Sources: HURREVAC LRL-DEBRIS	Page 16 of 19

US Army Corps of Engineers

Hurricane Sandy Nursing Homes

Landfall Expected In About **96** Hours

For Planning Purposes Only!



Most Probable Landfall Nursing Homes Inside Hurricane Force Winds

New York - 217
New Jersey - 68

Model results per County on following page

This model is based on a Category 1 storm making landfall on New York, NY.

Nursing Homes
Forecast Track

Information provided on this page displays a Category 1 storm making landfall on New York, NY. These projections are based on information from the NHC (1430 EDT 10/25/2012) forecast.
The number of nursing homes included in this output are those that would be included within estimated hurricane force winds (data source: HSIP Gold 2011).

Details about this model may be obtained at http://www.englink.usace.army.mil
or contact Louisville District staff at DLL-CELRL-GIS@usace.army.mil

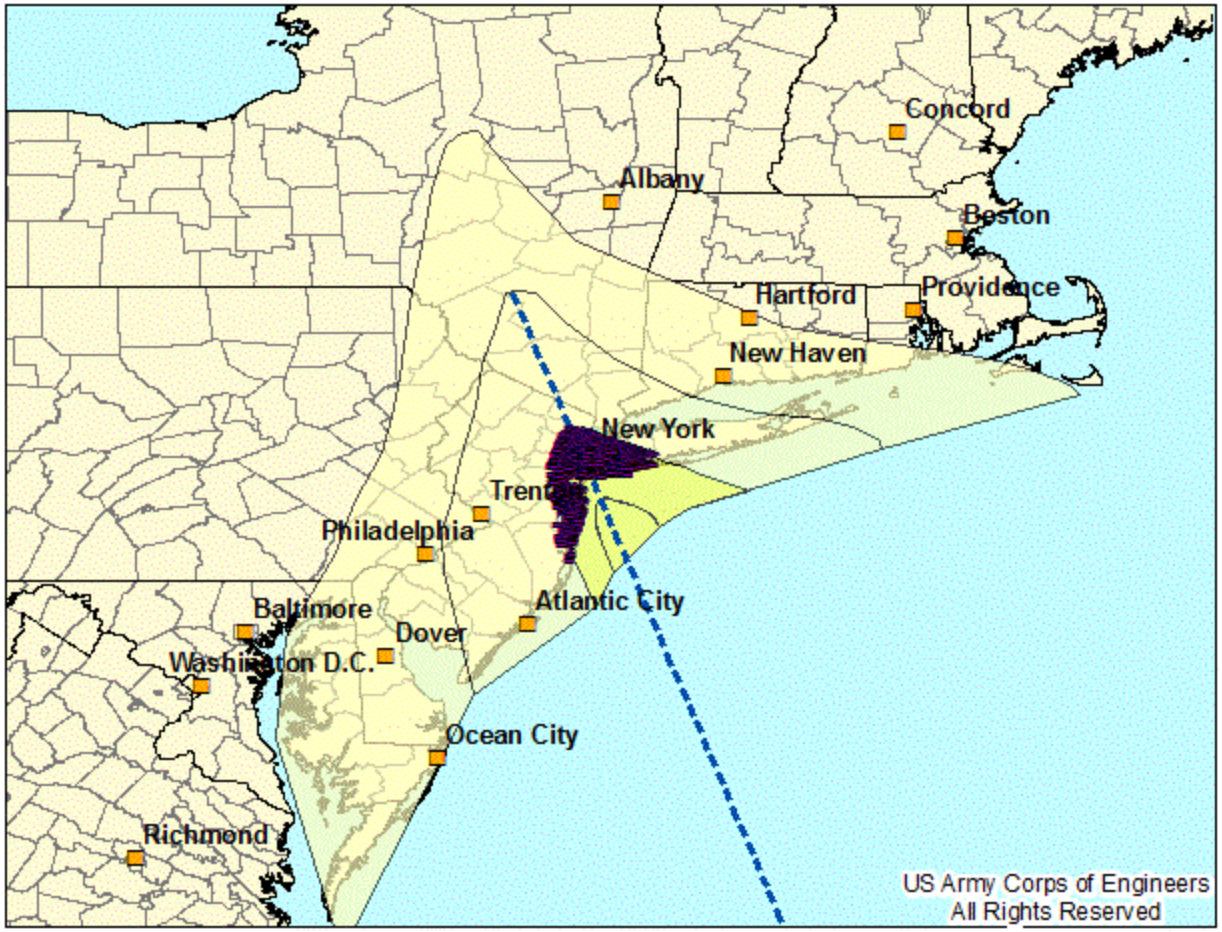
Hurricane Sandy Nursing Homes	
Generated By: P.Keown, LRL 1500 EDT 10/25/2012	
Sources: HURREVAC LRL-DEBRIS	Page 17 of 19

US Army Corps of Engineers

Hurricane Sandy Schools

Landfall Expected In About **96** Hours

For Planning Purposes Only!



Most Probable Landfall Schools Inside Hurricane Force Winds

New York - 1,498
New Jersey - 420

Model results per County on following page

This model is based on a Category 1 storm making landfall on New York, NY.

Schools
Forecast Track

Information provided on this page displays a Category 1 storm making landfall on New York, NY. These projections are based on information from the NHC (1430 EDT 10/25/2012) forecast.
The number of schools included in this output are those that would be included within estimated hurricane force winds (data source: HSIP Gold 2011).

Details about this model may be obtained at http://www.englink.usace.army.mil
or contact Louisville District staff at DLL-CELRL-GIS@usace.army.mil

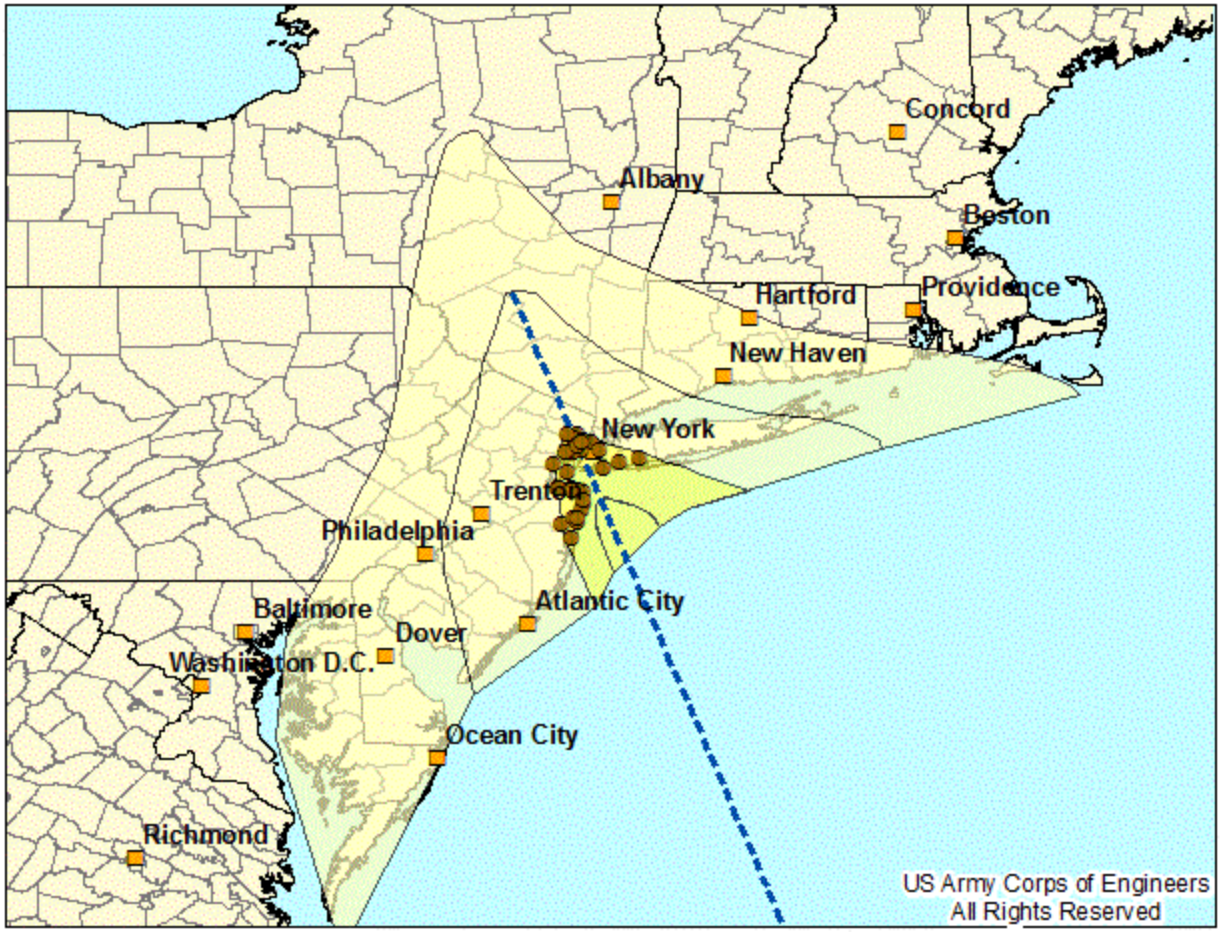
Hurricane Sandy Schools	
Generated By: P.Keown, LRL 1500 EDT 10/25/2012	
Sources: HURREVAC LRL-DEBRIS	

Hurricane Sandy Sewage Treatment Plants

US Army Corps of Engineers

Landfall Expected In About **96** Hours

For Planning Purposes Only!



Most Probable Landfall Sewage Treatment Plants Inside Hurricane Force Winds

New Jersey - 30
New York - 7

Model results per County on following page

This model is based on a Category 1 storm making landfall on New York, NY.

Sewage Treatment Plants
Forecast Track

Information provided on this page displays a Category 1 storm making landfall on New York, NY. These projections are based on information from the NHC (1430 EDT 10/25/2012) forecast.
The number of sewage treatment plants included in this output are those that would be included within estimated hurricane force winds (data source: HSIP Gold 2011).

Details about this model may be obtained at http://www.englink.usace.army.mil
or contact Louisville District staff at DLL-CELRL-GIS@usace.army.mil

Hurricane Sandy Sewage Treatment Plants	
Generated By: P.Keown, LRL 1500 EDT 10/25/2012	
Sources: HURREVAC LRL-DEBRIS	